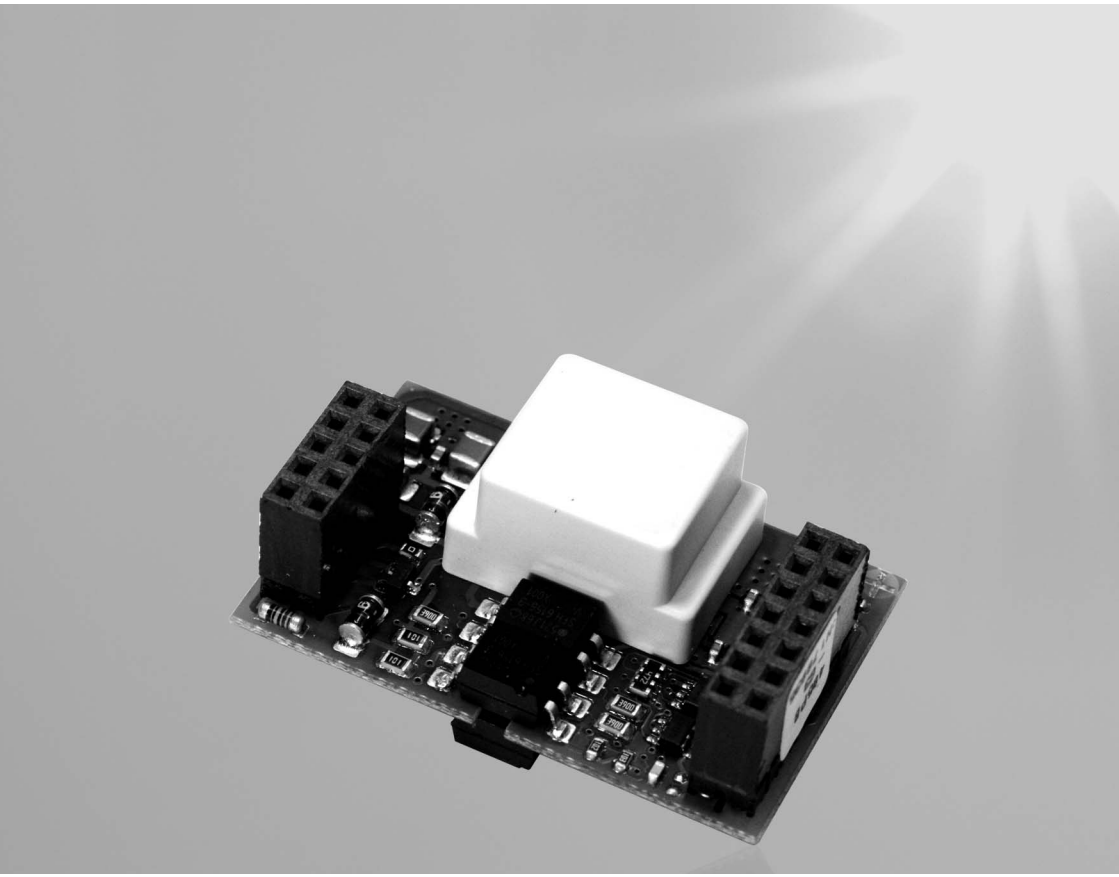
Device for plant monitoring

232USPB-NR

Installation Manual



232USPB-NR-eng-IUS113210 | 98-0047010 | Version 1.0

CA US

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SMA America, LLC
3801 N. Havana Street
Denver, CO 80239 U.S.A.

SMA Solar Technology Canada Inc.
2425 Matheson Blvd. E
8th Floor
Mississauga, ON L4W 5K5
Canada

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for the following products:

- 232USPB-NR

This manual must be followed during installation and maintenance.

The product is designed and tested according to international safety requirements, but as with all electrical and electronic equipment, certain precautions must be observed when installing and/or operating the product. To reduce the risk of personal injury and to ensure the safe installation and operation of the product, you must carefully read and follow all instructions, cautions and warnings in this manual.

Warnings in this document

A warning describes a hazard to equipment or personnel. It calls attention to a procedure or practice, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the SMA equipment and/or other equipment connected to the SMA equipment or personal injury.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

Other Symbols in this document

In addition to the safety and hazard symbols described on the previous pages, the following symbol is also used in this manual:

Information

This symbol accompanies notes that call attention to supplementary information that you must know and use to ensure optimal operation of the system.

General Warnings

⚠ WARNING

General Warnings

All electrical installations must be done in accordance with the local and *National Electrical Code*® ANSI/NFPA 70 or the *Canadian Electrical Code*® CSA C22.1. This document does not and is not intended to replace any local, state, provincial, federal or national laws, regulation or codes applicable to the installation and use of the product, including without limitation applicable electrical safety codes. All installations must conform with the laws, regulations, codes and standards applicable in the jurisdiction of installation. SMA assumes no responsibility for the compliance or noncompliance with such laws or codes in connection with the installation of the product.

The product contains no user-serviceable parts except for the fans on the bottom of the enclosure and the filters behind the fans as well as the handle covers on the sides of the unit. For all repair and maintenance, always return the unit to an authorized SMA Service Center.

Before installing or using the product, read all of the instructions, cautions, and warnings in this manual.

Before connecting the product to the electrical utility grid, contact the local utility company. This connection must be made only by qualified personnel.

Wiring of the product must be made by qualified personnel only.

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1 Information on this Manual

Validity

This manual is valid for the communication interface "232USPB-NR".

This manual does not contain any detailed information about the connected devices. Detailed information about the connected devices is provided in the manuals for the devices.

Target group

This manual is intended for skilled workers. Only qualified personnel is allowed to perform the tasks set forth in this manual (see section 2.2 "Target Group Qualification", page 10).

Nomenclature

In this manual, the 232USPB-NR is referred to as communication interface.

SMA America Production, LLC and SMA Solar Technology Canada Inc. are hereinafter referred to as SMA.

Abbreviations

Abbreviation	Description	Explanation
AC	Alternating Current	Alternating current
DC	Direct Current	Direct current

2 Safety

2.1 Intended Use

The 232USPB-NR is a communication interface connecting an inverter with other communication products by wires.

The following inverters will be supported:

- SB/WB 700-U
- SB/WB 1100-U
- SWR 1800-U
- SWR 2100-U
- SWR 2500-U
- SB/WB 3000-US
- SB 3300-U
- SB 3800-U
- SB 4000-US
- SB/WB 5000-US
- SB/WB 6000-US
- SB/WB 7000-US
- SB/WB 8000-US
- SB 6000-U

Only use the communication interface in accordance with the information provided in the enclosed documentation. Any other use can result in personal injury or property damage.

The enclosed documentation is part of this product.

- Read and observe the documentation.
- Keep the documentation in a convenient place for future reference.

2.2 Target Group Qualification

Skilled workers have received training and have demonstrated skills and knowledge in the construction and operation of this device. Skilled workers are trained to deal with the dangers and hazards involved in installing electrical installations.

2.3 Safety Instructions

⚠ DANGER

Risk of lethal electric shock

Lethal voltages are present in the inverter.

- Prior to performing any work on the inverter, disconnect the inverter on the AC and DC side (see inverter installation manual).
- All work on the inverter may only be carried out by a electrically qualified person.

NOTICE

Electrostatic discharges can damage the communication interface

Component parts of the communication interface can be damaged by electrostatic discharges.

- Avoid any contact with component parts and plug contacts.
- Before touching a component part ground yourself by touching a protective conductor or a non-coated part of the inverter enclosure.

3 Product Description

The 232USPB-NR is a communication interface connecting an inverter with other communication products by wires.

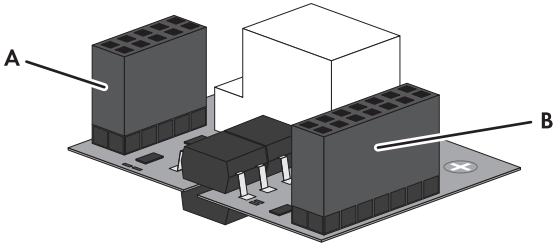


Figure 1: RS232 communication interface

Position	Designation
A	Pin row, short
B	Pin row, long

You can connect the inverter to the serial interface of a PC by means of the communication interface and a communication cable with DE9 plug.

4 Scope of Delivery

Check the delivery for completeness and any visible external damage. Contact your retailer if the delivery is incomplete or you find any damage.

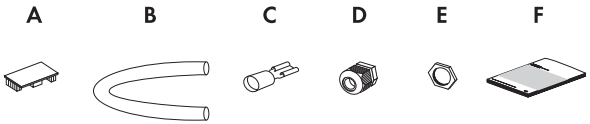


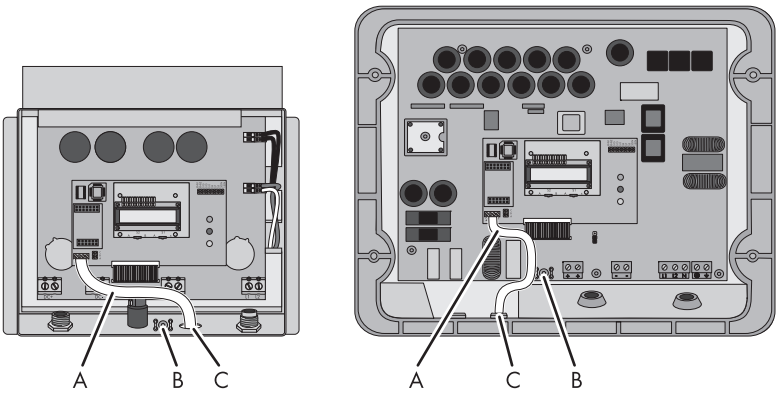
Figure 2: Components included in delivery

Position	Quantity	Designation
A	1	Communication interface 232USPB-NR
B	1	Insulating hose
C	1	Flat male tab
D	1	Cable gland with single seal insert
E	1	Counter nuts for the cable glands
F	1	Installation manual

5 Electrical Connection

5.1 Slot and Cable Route

Inverter of type SB/WB

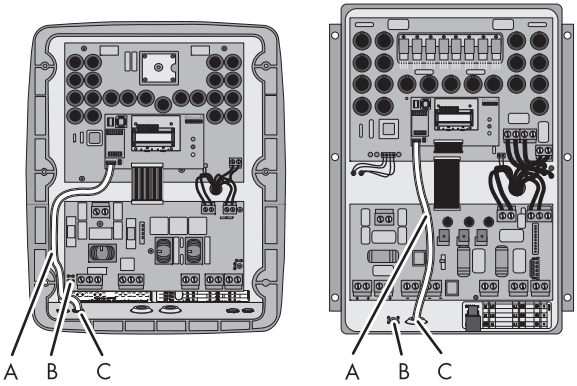


SB/WB 700-U
SB/WB 1100-U

SB/WB 3000-US
SB 3300-U
SB 3800-U
SB 4000-US

Figure 3: Slot and cable route for inverters of type SB/WB

Position	Designation
A	Cable route from the interface slot to cable gland
B	Mounting tab for PE
C	Cable gland



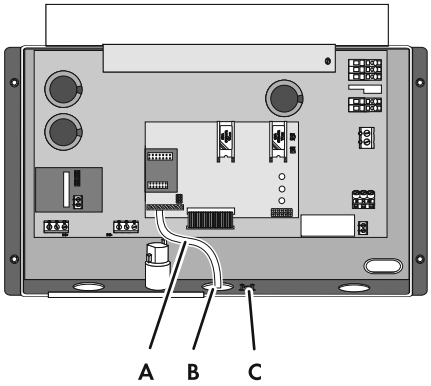
SB/WB 5000-US
SB/WB 6000-US
SB/WB 7000-US
SB/WB 8000-US

SB 6000-U

Figure 4: Slot and cable route for inverters of type SB/WB

Position	Designation
A	Cable route from the interface slot to cable gland
B	Mounting tab for PE
C	Cable gland

Inverter of type SWR



SWR 1800-U
SWR 2100-U
SWR 2500-U

Figure 5: Slot and cable route for inverters of type SWR

Position	Designation
A	Cable route from the interface slot to cable gland
B	Cable gland
C	Mounting tab for PE

5.2 Installing the Communication Interface

⚠ DANGER

Risk of lethal electric shock

High voltages are present in the inverter.

- Before opening the inverter, disconnect AC and DC voltage.

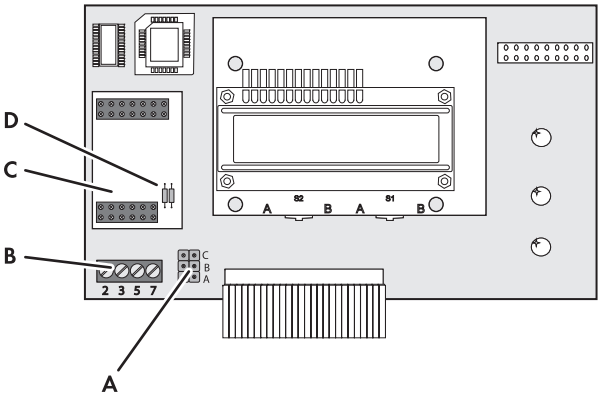
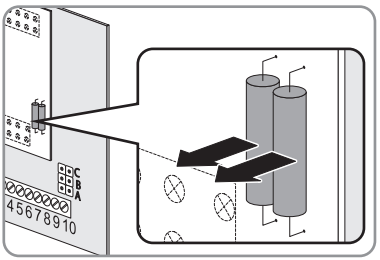


Figure 6: Interface slot (example)

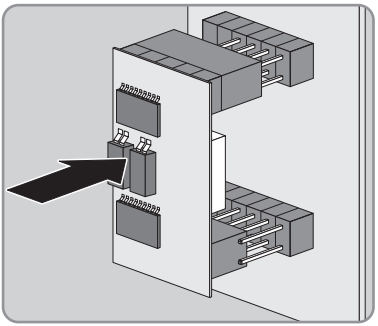
Position	Designation
A	Jumper slot
B	Screw terminal for connecting the communication cabling
C	Interface slot
D	Resistors*

* Only for inverters of type SWR

1. Open inverter (see inverter installation manual).
2. In case of an inverter of type SWR, remove the resistors marked with a black ring. Use diagonal cutting pliers.

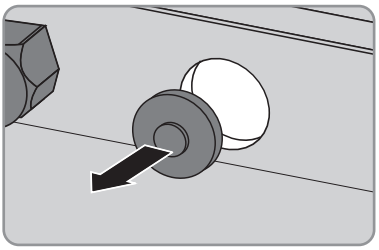


3. Plug in the communication interface flush-left on the communication interface slot. Leave the two pins on the right side of the short row of pins free.

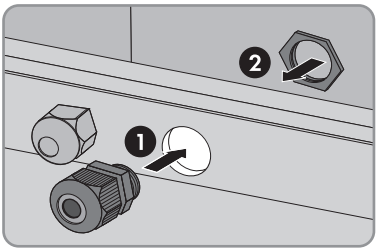


5.3 Preparing the Enclosure Opening on the Inverter

1. Push the filler-plug out of the enclosure opening of the inverter.



2. Insert the cable gland with single seal insert into the enclosure opening and fasten it with a counter nut.



3. Loosen the nut of cable gland so that the cables can be inserted.

5.4 Installing a Communication Cable in the Inverter

NOTICE

Damage of the communication interface and interference of communication by improper installation of the communication cable

Incorrectly laid cables can disturb the communication.

- Lay the communication cable separately from the AC cable.

NOTICE

Metal or cable scraps can damage the inverter

Metal or cable scraps can cause short circuits.

- Do not leave metal or cable scraps in the inverter.
- Remove any metal or cable scraps, if necessary.

Additional required material (not included in scope of delivery)

☐ Communication cable with DE9 plug (D-Sub 9-pole)

Communication cable requirements

☐ Cross section of the communication cable is at least 2 x 2 x AWG 24 (2 x 2 x 0.25 mm²).

☐ Communication cable is shielded.

☐ The length of the communication cable is at maximum 32 ft. (10 m).

☐ The communication cable has twisted pair conductors (twisted pair).

☐ If the communication cable is to be laid outdoors, the cable must be UV resistant.

Recommendation for cable types:

SMA recommends the following SMA cable types:

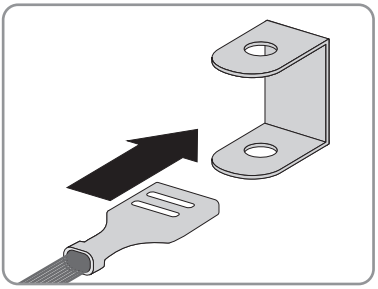
- COMCAB-INxxx* for indoor use

The cable types are available in following lengths:

- 100: 328 ft. (100 m)
- 200: 656 ft. (200 m)
- 500: 1 640 ft. (500 m)
- 1 000: 3 280 ft. (1 000 m)

* xxx stands for the cable length

1. Guide the communication cable through the cable gland of the inverter.
2. Strip the communication cable to the length of the cable route.
3. Shorten unused insulated conductors until flush with the cable sleeve.
4. Shorten the shield of the cable to the length of the cable route for PE connection.
5. Twist the wires of the cable shield and combine it with a flat male tab.
6. Put the flat male tab on the mounting tab for PE (see section 5.1 "Slot and Cable Route", page 14).
7. Strip $^1/_4$ in. (6 mm) off the conductor insulation.
8. Tighten the nut of the cable gland to fix the communication cable.

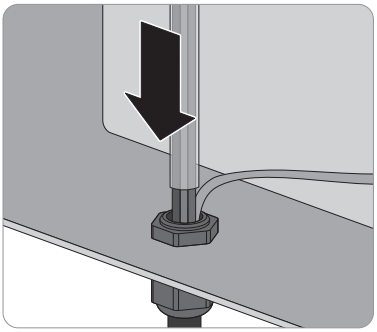


9. **⚠ DANGER**

   Risk of lethal electric shock due to faulty installation

   Communication cables incorrectly insulated and installed may cause high voltages.

   - Pull the insulating hose over the communication cable to ensure that the cable is completely insulated. Do not insulate the shield of the cable.
   - Shorten the insulating hose to the length of the cable route.



10. Lay the cable with insulating hose to the screw terminals. Observe the cable route (see section 5.1).

5.5 Connecting the Cable to the Communication Interface

NOTICE

Damage to the connecting terminal plate if bootlace ferrules are used

Bootlace ferrules deform when tightening the screw terminals and can no longer be removed from the connecting terminal plate.

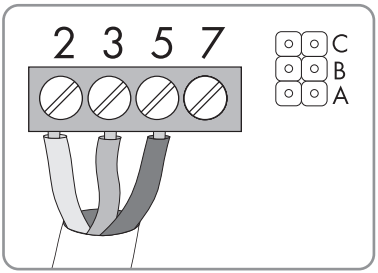
- Do not use wire sleeves when connecting the communication cable.

Terminal assignment for SB/WB and SWR inverter models

The terminal assignment for SB/WB and SWR inverter models is identical.

1. Remove screws of the screw terminals below the interface slot.
2. Connect the conductor to the screw terminals (2, 3, 5).

   Tip: The conductors must comply with the assignment of the DE9 plug.
3. Tighten the screw terminals to a torque of 2 in-lbs (0.23 Nm).
4. Make sure that the cable is securely positioned in the screw terminal.



5. Write down the color of the insulated conductors:

Screw terminal	Insulated conductor color
2	
3	
5	

6. Close inverter (see inverter installation manual).

6 Decommissioning

6.1 Disassembly

⚠ DANGER

Risk of lethal electric shock

High voltages are present in the inverter during operation.

- Disconnect the inverter on the AC and DC side.
- Ensure that no voltage is present.
- Open the inverter as described in the installation manual of the inverter.

1. Remove the communication interface.
2. Remove the screw of the screw terminal and disconnect the insulated conductors.
3. Remove jumper where applicable.
4. Remove cable tie where applicable.
5. Remove the cable shield from the PE connector.
6. Remove the insulating hose.
7. Loosen the nut of the cable gland.
8. Pull the cable out of the device.
9. Remove the cable gland from the enclosure.
10. Plug the enclosure opening at the bottom of the inverter with a filler-plug.
11. Close inverter (see inverter installation manual).

6.2 Disposal

Dispose of the communication interface in accordance with the disposal regulations for electronic waste which apply at the installation site at that time. Alternatively, send it back to SMA with shipping paid by sender, and the information "ZUR ENTSORGUNG" ("FOR DISPOSAL").

7 Technical Data

Mechanical size

Width x Height x Depth	$1\frac{7}{64}$ in. x $1\frac{21}{32}$ in. x $\frac{5}{8}$ in. (28 mm x 42 mm x 16 mm)
Weight	$\frac{1}{2}$ oz. (14 g)
Mounting location	in the inverter

Connections

Communication bus	in the inverter

Communication

Communication interface	RS232
Maximum communication range	32 ft. (10 m)

Environmental conditions

Ambient temperature in operation	– 13°F ... +185°F (– 25°C ... +85°C)
Relative humidity, non-condensing	5% ... 95%

8 FCC Compliance Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A & B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- The user is cautioned that changes or modifications not expressly approved by SMA America, Inc. could void the user's authority to operate this equipment.

9 Contact

If you have technical problems concerning our products, contact the SMA Service Line. We require the following information in order to provide you with the necessary assistance:

- Type and serial number of inverter
- Type and number of modules connected
- Communication method
- Inverter failure or warning number
- Display message of the inverter

SMA Solar Technology America, LLC
6020 West Oaks Blvd, Ste 300
Rocklin, CA 95765
Tel. +1 916 625 0870
Tel. +1 877-MY SMA TECH
Tel. +1 877 697 6283 (Toll free, available for USA, Canada and Puerto Rico)
Fax +1 916 625 0871
Service@SMA-America.com
www.SMA-America.com

SMA Solar Technology Canada Inc.
2425 Matheson Blvd E, 8th Floor
Mississauga, ON L4W 5K5, Canada
Tel. +1 877 506 1756 (Toll free, available for Canada)
Service@SMA-Canada.ca
www.SMA-Canada.ca

SMA Solar Technology

www.SMA-Solar.com

SMA America, LLC
www.SMA-America.com